

S/N 10/539,758

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	ANTONISSEN et al.	Examiner:	YANG, Jie
Serial No.:	10/539,758	Group Art Unit:	1793
Filed:	December 23, 2005	Docket No.:	09997.0124USWO
Customer No.:	23552	Confirmation No.:	6616
Title:	STEEL COMPOSITION FOR THE PRODUCTION OF COLD ROLLED MULTIPHASE STEEL PRODUCTS		

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Filed EFS-WEB
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DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop RCE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

1. I, Joachim Antonissen, declare and say as follows:
2. I have a masters in material science from Ghent University and 12\_ years of experience working in the field of metallurgical product development. I am an inventor on 3 patents in this field as well as author and co-author of several scientific papers and promoter of 2 PhD thesis related to this field.
3. I am an inventor of the U.S. patent application identified above. I have reviewed the Office Action dated February 1, 2010 including a rejection that the claims of this application are obvious over U.S. Patent No. 6,589,369 to Yokoi et al. I respectfully disagree with the rejection, because the claimed cold rolled steel composition has bake hardening (BH2 values) that would have been unexpected before the present invention at the high levels of aluminum listed in the claim.
4. The claimed cold rolled steel composition has bake hardening (BH2) greater than 40 MPa in both longitudinal and transversal directions. It would not have been expected at the time this application was filed to achieve this degree of bake hardening at aluminum levels above 11,000 ppm.

5. We subjected cold rolled steel test samples according to claim 1 to Bake Hardening tests according to the norm SEW094. BH2 values express the difference between the yield strength of a sample that has undergone controlled ageing and 2% prestrain, and the yield strength of said same sample having undergone a controlled baking step (details of all the various steps are set out in the norm SEW094).

6. The composition of the tested samples was (values in ppm) :

C	Mn	Si	P	S	Al	N	Ti	Cr	Ni	Cu	As	Sn	Nb	Mo	V	Sb
1872	16457	3469	724	63	12018	44	77	246	239	204	27	49	27	273	45	59

The levels of Cr, Ni, Cu, As, Sn, Mo and Sb are incidental impurities. The remainder of the samples was essentially Fe. This composition thus has ingredients that fall in the ranges in claim

1. The samples had the following microstructure:

Ferrite : 80vol%  
Bainite : 10vol%  
Retained Austenite : 10vol%  
Martensite : 0

Measurements of the microstructure phases have a margin error of at least 5 vol%. Thus, I conclude that the samples correspond to the claimed microstructure.

7. The following tables show the Bake Hardening values BH2 obtained on the samples, in three separate tests, in transverse and in longitudinal directions:

	Transverse Direction		
	aged + 2% prestrain	aged + 2% prestrain + BH	BH2
Test 1	542	632	90
Test 2	543	630	87
Test 3	541	628	87
Average			88
Std. Dev.			1.7

	Longitudinal Direction		
	aged + 2% prestrain	aged + 2% prestrain + BH	BH2
Test 1	523	615	92
Test 2	523	617	94
Test 3	522	616	94
Average			93
Std. Dev.			1.2

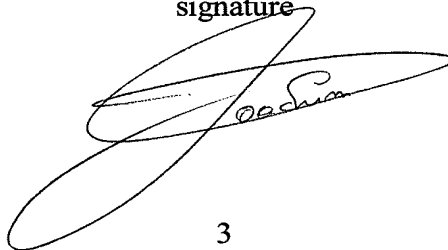
All the BH2 values that were obtained exceed 40MPa.

8. Such high BH2 values would not have been expected at the time of the invention. The high Al-level of 12018ppm would have led the skilled person to believe that BH2 would be lower due to the binding of Al by N, leading to a decrease in the number of dislocations formed by unbound Al, which are normally expected to be required in order to have good BH-characteristics. Further research has revealed that these high BH2-values are due to dislocation pinning by the high level of C available in these steel grades (a mechanism called Cottrell atmosphere). At the time of the invention however, this result would not have been expected.

9. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Date: June 30<sup>th</sup>, 2010

signature

A handwritten signature in black ink, appearing to be "J. S. Kim", is written over a large, loopy circular flourish.